

# PATENT ABSTRACTS OF JAPAN

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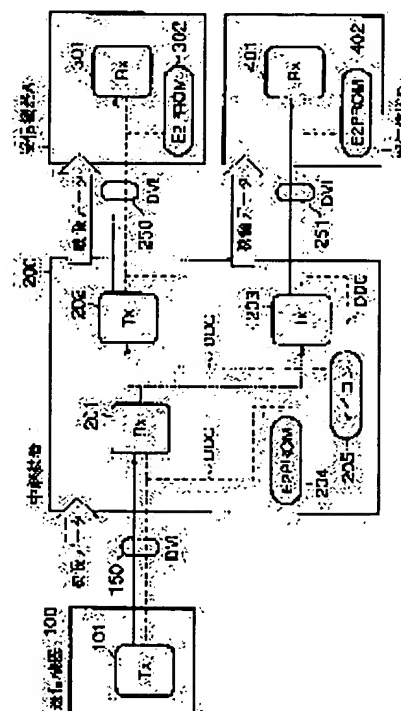
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## (54) DATA REPEATER, RELAYING METHOD, AND TRANSMISSION SYSTEM

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a data repeater that relays video data which a receiver can display without the need for any revision of a transmission apparatus.

**SOLUTION:** A microcomputer 205 of the repeater 200 acquires extended display identification data of the receivers A, B from E2PROMs 302, 402, creates extended display identification data of its own on the basis of the extended display identification data and records the own extended display identification data to the E2PROM 204. The transmission apparatus 100 reads the extended display identification data recorded in the E2PROM 204 and transmits optimum video data to a DVI (Digital Visual Interface) reception LSI 201 of the repeater 200 according to the extended display identification data. The DVI reception LSI 201 decodes data received from the transmission apparatus 100 and distributes the data to DVI transmission LSIs 202, 203. The DVI transmission LSIs 202, 203 encode the data and transmits the decoded data to the receivers A, B, respectively.



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the image distributor which distributes the image data transmitted from the transmitter machine to two or more receivers about the data repeating installation which relays image data etc. especially using DVI (Digital Visual Interface).

[0002]

[Description of the Prior Art] When transmitting image data by DVI used by a liquid crystal display monitor etc., a transmitter machine acquires the device information (EDID : Extended Display Identification Data) on a receiver (display devices, such as a liquid crystal display monitor) through DDC on DVI (Display Data Channel). A transmitter machine transmits suitable image data to a receiver based on the acquired information after that.

[0003] It is specified to EDID which parameter the manufacture name which each receiver supports, resolution, the property (timing, maximum frequency) of a video signal, a gamma property, color depth, etc. consist of information about the display property of the receiver, and is in the offset address of the device. Moreover, the address on DDC of the device which recorded EDID is defined beforehand, and a transmitter machine acquires EDID from the device of the address. In addition, about the detail of DVI, the detail of EDID and DDC is explained to <http://www.ddwg.org/> at <http://www.vesa.org/>, respectively.

[0004] In distributing the same image data to two or more receivers from one transmitter machine, it uses repeating installation (Repeater). Drawing 5 is the block diagram showing the outline configuration of the conventional repeating installation. The transmitter machines 1, such as a personal computer, are transmitted to repeating installation 2 by using image data as DVI data. After repeating installation 2 decodes the DVI data received from the transmitter machine 1, it is distributed to plurality, is again encoded as DVI data, and is transmitted to two or more receivers A and B, such as a liquid crystal display monitor.

[0005]

[Problem(s) to be Solved by the Invention] Since a transmitter machine could not acquire EDID of a receiver directly when the same image data were distributed using repeating installation, there was a problem of \*\* that a transmitter machine could not transmit the image data of suitable resolution, for example.

[0006] Therefore, without changing a transmitter machine in any way, this invention makes the image data which can be displayed by the receiver transmit to a transmitter, and aims at relaying these data to a receiver.

[0007]

[Means for Solving the Problem] When two or more receivers with different EDID are connected, the data repeating installation by this invention creates one EDID from these EDID(s), and records it on record means, such as E2PROM. A transmitter transmits the image data according to EDID recorded on this record means. Therefore, suitable image data can be made to transmit, without showing single EDID in a transmitter machine and carrying out processing special in any way at a transmitter machine, even if

a receiver with different EDID is connected.

[0008] Namely, a transmitting means for the repeating installation of this invention to receive data from an external transmitter machine, and to transmit these data to one or more external receivers, An acquisition means to acquire the device information about said one or more receivers from this receiver, The device information on a self-device was created from one or more device information acquired from said external transmitter machine by record means to record the device information on a self-device possible [ read-out ], and said acquisition means, and it has a creation means to record the device information on a self-device on said record means.

[0009] For example, when two or more receivers from which resolution differs are connected to repeating installation, repeating installation reads EDID of each receiver, chooses the highest high resolution information from two or more EDID(s), and it stores in E2PROM of a self-device. A transmitter machine reads EDID of this repeating installation, and can transmit the suitable image data according to the highest resolution to a receiver.

[0010] Moreover, a transmitter machine can transmit the image data based on EDID of the receiver at which a user wants to gaze by recording EDID of the device which the user chose on E2PROM as EDID of repeating installation.

[0011] Moreover, when the receiver respectively corresponding to two or more resolution is connected to repeating installation, the image outputted from the transmitter machine which acquired the EDID can be displayed in every receiver by recording common resolution on E2PROM of repeating installation as EDID.

[0012] Moreover, a transmitter machine can be prevented from transmitting the image data which separated greatly from the receiving property of each receiver by setting up the mean value (it asking with the average etc.) of a receiver as EDID of repeating installation in the case of the parameter of EDID which cannot set up common values, such as a gamma property and color depth.

[0013] Moreover, for every data transmit port of repeating installation, priority is defined beforehand, and a user doubles the order of a device to give priority to with this priority and display, and connects each receiver to the data transmit port of repeating installation. The data which fitted by this the receiver which a user wants to give priority and to display to can be transmitted from a transmitter machine.

[0014] Furthermore, after acquiring EDID of two or more receivers, repeating installation sets a specific flag while recording all acquired EDID(s) on E2PROM as device information on a self-device. With the flag, a sending set can read all the EDID(s), if it detects that there is two or more EDID information, and it can transmit data by the suitable decision criterion.

[0015]

[Embodiment of the Invention] Hereafter, the gestalt of this operation is explained, referring to a drawing.

[0016] Drawing 1 is the block diagram showing the configuration of the repeating installation 200 concerning 1 operation gestalt of this invention.

[0017] LSI201 for DVI reception (Rx) to which repeating installation 200 decodes receiving image data, and LSI for DVI transmission (Tx) which encodes image data -- the microcomputer 205 which controls synthetically E2PROM204 which stores data, such as 202, 203, and EDID, in un-volatilizing, and repeating installation 200 is included.

[0018] Drawing 2 is drawing showing the configuration at the time of connecting two receivers A and B to the repeating installation 300 of this invention.

[0019] The DVI image data flow transmitted from a transmitter machine is explained using drawing 2 . The DVI image data transmitted from LSI101 for DVI transmission of the transmitter machine 100 are transmitted to repeating installation 200 through DVI150. The DVI image data transmitted to repeating installation 200 are decoded by LSI201 for DVI reception, and are changed with digital image DETAHE of 24 bits of RGB. The 24 bit digital image data of this RGB are distributed to two LSI in repeating installation. That is, another side is distributed for one 24 bit digital image data of RGB to LSI202 for DVI transmission at LSI203 for DVI transmission.

[0020] LSI202 for DVI transmission encodes the transmitted digital image data, and is transmitted. The

transmitted DVI image data are transmitted to Receiver A through DVI250. The transmitted DVI image data are decoded by LSI301 for DVI reception, turn into digital image data of 24 bits of RGB, and are displayed with the display (not shown) which Receiver A has.

[0021] Moreover, LSI203 for DVI transmission encodes the transmitted digital image data, and is transmitted. The transmitted DVI image data are transmitted to Receiver B through DVI251. The transmitted DVI image data are decoded by LSI401 for DVI reception, turn into digital image data of 24 bits of RGB, and are displayed with the display (not shown) which Receiver B has.

[0022] The above is the DVI image data flow transmitted from the transmitter machine 100.

[0023] Next, a procedure until it pours DVI image data in the repeating installation 200 of this invention is explained. Drawing 3 is a flow chart which shows actuation of repeating installation 200.

[0024] Repeating installation 200 makes inactive the signal of DVI150 which has connected with the transmitter machine 100 first (step S1). This is performed by dropping the 1 control line on DVI150 to a low level. Thereby, EDID stored in E2PROM204 of repeating installation 200 is not read with the transmitter vessel 100.

[0025] Next, repeating installation 200 acquires EDID of Receiver A from E2PROM302 of the receiver A connected through DDC250a on DVI250 (step S2). Moreover, EDID of Receiver B is acquired from E2PROM402 of the receiver B connected through DDC251a on DVI251 (step S3). Repeating installation 200 creates the device information on a self-device from the device information on Receivers A and B (step S4). For example, repeating installation 200 compares each acquired EDID with a microcomputer 205, from two EDID(s), EDID corresponding to high resolution is chosen and selected EDID is stored in E2PROM204 which repeating installation 200 has (step S5). If it finishes storing EDID in E2PROM204, repeating installation 200 will be making high-level the 1 above-mentioned control line on DVI150, for example, and will activate DVI150 (step S6).

[0026] If DVI150 becomes active, the transmitter machine 100 will acquire EDID stored in E2PROM204 of repeating installation 200 through DDC on DVI150, before transmitting DVI image data, and will transmit the optimal image data based on this EDID. The repeating installation 200 which received this image data transmits the same image data to Receivers A and B.

[0027] Thereby, the transmitter machine 200 can transmit the image according to the receiver of high resolution among Receiver A and Receiver B. Consequently, a user can view and listen to a high resolution image using the receiver of high resolution among Receivers A and B. This operation gestalt needs to have neither a resolution conversion function nor a filter function in repeating installation 200, and can realize it at cheap cost. Moreover, it can realize, without changing the conventional transmitter machine and a receiver in any way.

[0028] Next, other operation gestalten of this invention are explained.

[0029] In the above, although EDID(s) (resolution etc.) of one of the two were recorded on E2PROM204 of repeating installation 200 in Receiver A and Receiver B, there is also the approach of acquiring common EDID. The list of two or more resolution to which for example, this receiver can respond is stored in E2PROM of a receiver. In such a case, repeating installation 200 chooses receipt information, such as resolution common to both receivers, and stores it in E2PROM204. Therefore, the transmitter machine 200 does not transmit the image (resolution) which Receiver A and Receiver B do not support, and transmits an image in resolution common to both receivers. In this case, a normal image is displayed on both Receiver A and the receiver B.

[0030] Moreover, there is also information which cannot acquire common information, such as a gamma property and color depth, in EDID. In the case of such information, it is possible to set up the value possible nearest to the receiver property of Receiver A and the receiver property of Receiver B using a suitable formula (average) etc. according to each parameter. By carrying out like this, the suitable value for E2PROM of repeating installation is recordable also to EDID without the common information.

[0031] Moreover, like drawing 4, in the case of the repeating installation 200 with a user interface (I/F) 206, the receiver of specification [ a user ] can be chosen by user I/F206, and EDID of the selected device can also be recorded on E2PROM204. In this case, EDID of the receiving (display) device at which especially a user wants to gaze is storable in E2PROM204 of repeating installation 200.

Therefore, based on EDID of the receiver at which especially a user wants to gaze, the transmitter machine 200 has the advantage that image data can be transmitted. Moreover, in addition to the receiver which the user chose, it is also possible not to transmit image data and it can prevent transmitting the image data which are not fitness by this to a receiver.

[0032] Moreover, priority is beforehand set to the transmit port (connection origin with a receiver) of repeating installation, and EDID of the receiver connected to the high port of priority can also be recorded as device information on repeating installation. By this, in case a user connects a receiver, image data can be displayed on the high order of display priority the optimal.

[0033] furthermore, the device information to which repeating installation 200 acquired and acquired each device information from two or more data receivers A and B -- all -- E2PROM204 -- passing -- recording -- the transmitter machine 100 -- this -- based on all device information, as described above, suitable device information may be searched for, and image data may be transmitted to it at repeating installation 200. In this case, repeating installation 200 stands flag 204a (refer to drawing 1 ) which shows that the device information on all the receivers connected is recorded on E2PROM. With reference to this flag 204a, the transmitter machine 100 judges that the device information on all receivers is recorded on E2PROM, and searches for suitable device information.

[0034] Although the above operation gestalt explained the equipment which relays image data, according to this invention, it is clear that not only image data but voice data can be relayed by the same approach.

[0035]

[Effect of the Invention] Without adding modification to a transmitter machine in any way, as explained above, the image data which can display a receiver from a transmitter machine can be made to be able to transmit, and these image data can be relayed to a receiver.

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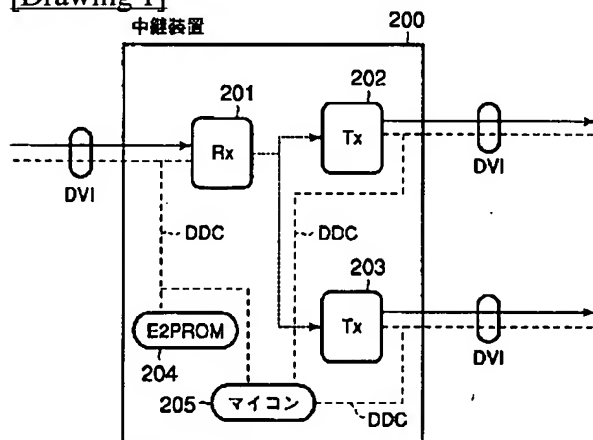
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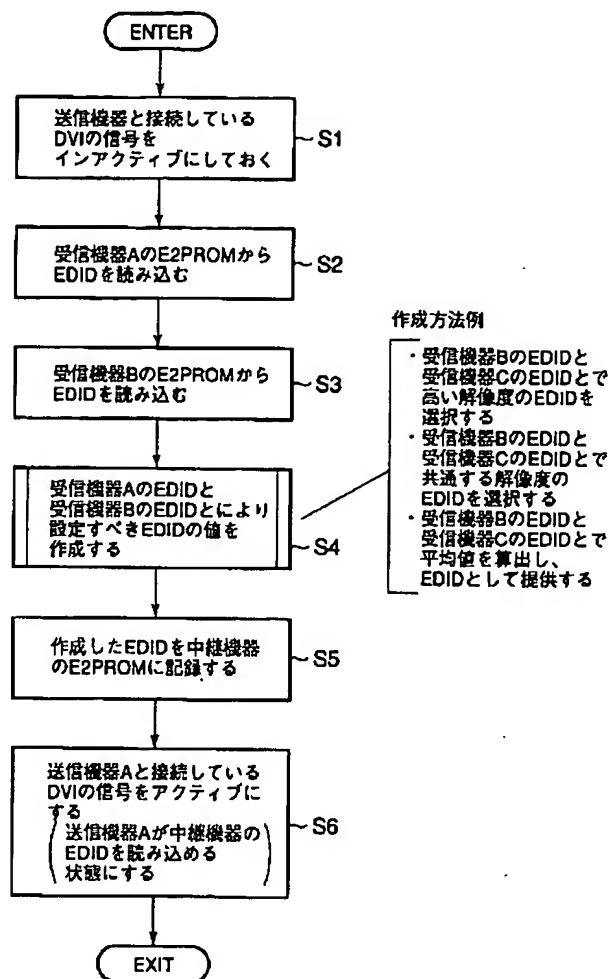
DRAWINGS

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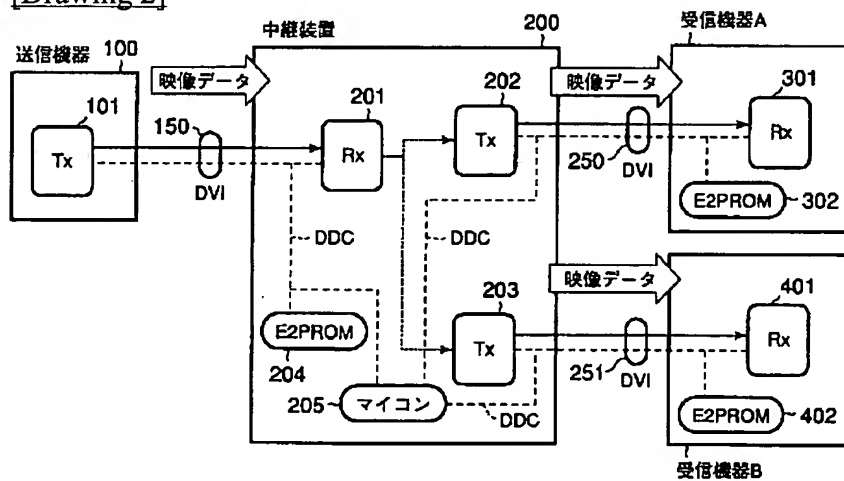
[Drawing 1]



[Drawing 3]

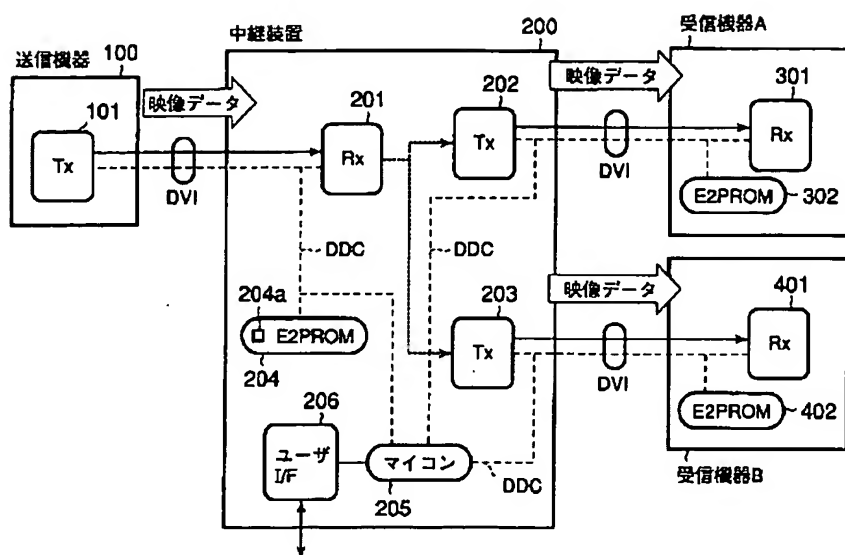


[Drawing 2]

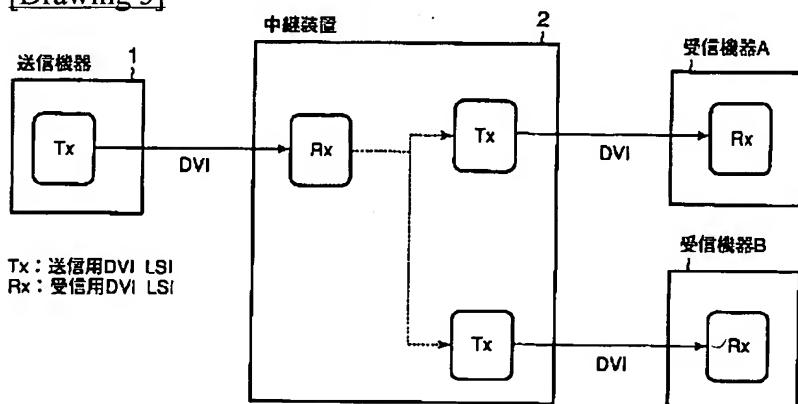


[Drawing 4]





[Drawing 5]



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CLAIMS

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[Claim(s)]

[Claim 1] A transmitting means to receive data from an external transmitter machine and to transmit these data to one or more external receivers, An acquisition means to acquire the device information about said one or more receivers from this receiver, Data repeating installation characterized by having a creation means to create the device information on a self-device from one or more device information acquired from said external transmitter machine by record means to record the device information on a self-device possible [ read-out ], and said acquisition means, and to record the device information on a self-device on said record means.

[Claim 2] Said creation means is data repeating installation according to claim 1 characterized by recording the device information on a specific receiver on said record means as device information on said self-device out of said one or more device information.

[Claim 3] It is the data repeating installation according to claim 1 which possesses further a user interface means for a user to choose one receiver from said one or more receivers, and is characterized by said creation means recording the device information on the receiver chosen by said user interface means on said record means as device information on said self-device.

[Claim 4] Said creation means is data repeating installation according to claim 1 characterized by what a common device information part is chosen from said one or more device information, and is recorded on said record means as device information on said self-device.

[Claim 5] Said creation means is data repeating installation according to claim 1 characterized by what the device information on said self-device is computed based on said one or more device information, and is recorded on said record means.

[Claim 6] Said creation means chooses common device information from said one or more device information about a part of device information on said self-device, and records it on said record means. The device information computed based on said one or more device information about a part of another device information on said self-device is recorded. It is the data repeating installation according to claim 1 characterized by recording the device information about the receiver chosen by the user through the user interface about a part of still more nearly another device information on said self-device.

[Claim 7] It is the data repeating installation according to claim 1 which connected said transmitting means and said one or more external receivers, possessed the connecting means in which priority was prepared respectively, and was characterized by said creation means recording the device information on the receiver connected to the connecting means which has the highest priority on said information record means.

[Claim 8] Data repeating installation given in claim 1 characterized by being data with which said data carried out multiplex [ of image data, voice data or an image, and the voice data ] thru/or any 1 term of 7.

[Claim 9] Said data are data repeating installation given in claim 1 characterized by being transmitted or received through DVI (Digital Video Interface) thru/or any 1 term of 8.

[Claim 10] The device information acquired from said receiver is data repeating installation given in

claim 1 characterized by being EDID (Extended Display Identification Data) thru/or any 1 term of 8.  
[Claim 11] It is the data transmission system which supplies the data transmitted from the transmitter machine to one or more receivers through repeating installation. Said repeating installation A transmitting means to receive data from an external transmitter machine and to transmit these data to one or more external receivers, An acquisition means to acquire the device information about said one or more receivers from this receiver, A record means to record the device information on a self-device more possible [ read-out ] than said external transmitter machine, A creation means to create the device information on a self-device from one or more device information acquired by said acquisition means, and to record the device information on a self-device on said record means, It has the flag which shows that said one or more device information is recorded on said Records Department. Said transmitter machine The read-out means which reads said one or more device information currently recorded on said Records Department based on the flag of said repeating installation, The data transmission system characterized by having a means to transmit the data according to the device information which created and created one device information based on said one or more device information read by said read-out means to said repeating installation.

[Claim 12] The data junction approach characterized by to provide the step which receives data from an external transmitter machine and transmits these data to one or more external receivers, the step which acquires the device information about said one or more receivers from this receiver, and the step which creates the device information on a self-device from said one or more device information, and records the device information on this self-device possible [ read-out ] from said external transmitter machine.

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[Translation done.]